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ABSTRACT

To provide remote psychiatric services to a population in Moose Factory, Ontario, via satellite, digital data links will be used to provide 24-hour access to the psychiatric medical file system and the psychiatric patient register at University Hospital, London, Ontario, and to permit scoring and interpretation of standard psychological tests. The experiments also will provide emergency and routine psychiatric consultation, supervision of procedures, and back-up expertise. Medical and para-medical staff will be educated through a TV-audio interactive link. The TV transmission method and the digital data link are explained, and the operational procedure are described. Methods to be used for implementing the Automated Psychological Test Battery also are described. (SK)

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REMOTE PSYCHIATRIC AND PSYCHOLOGICAL SERVICES VIA THE COMMUNICATIONS TECHNOLOGY SATELLITE (CTS) (SERVICES PSYCHIATRIQUES ET PSYCHOLOGIQUES A DISTANCE PAR LES COMMUNICATIONS SATELLITE (CTS))

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ABSTRACT

The Department of Psychiatry has initiated a project to provide remote psychiatric services to a population in Moose Factory Ontario via the CTS (satellite) at the end of 1976. This program has two aspects:

1. A psychological test battery with automatic scoring interpretation of psychological tests (now running on a PDP-10).
2. A psychiatric information register based on the PDP-11/40 computer at University Hospital.

In addition, another purpose of this project is to provide emergency and routine psychiatric consultations, supervision of procedures and back-up expertise, and education programs to medical and paramedical staff through the use of both a TV-audio linkage and a standard radio link.

This project will provide an opportunity to a remote community to assess the need for computer services of the registry type. Data entry to the system is via mark-sense forms or an interactive terminal. (Le Département de Psychiatrie a initié un projet pour fournir de loin des services psychiatriques à la population de Moose Factory, Ontario, par le CTS (satellite) à la fin de l'année 1976. Ce programme présente deux aspects:

1. Une batterie d'épreuves psychologiques avec compte automatique interprétant les épreuves psychologiques fonctionnant en ce moment sur un PDP-10.
2. Un registre d'information psychiatrique fondé sur le PDP-11/40 computeur à l'Hôpital de l'Université.

En plus, un autre but de ce projet est de founir des consultations psychiatriques urgentes ou de routine, de surveiller

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les procédés des experts, et de fournir des programmes d'éducation aux corps médicaux et paramédicaux à l'aide d'une liaison de télévision audio et radio ordinaire. Ce projet fourni l'occasion à une communauté isolée d'estimer la nécessité d'obtenir les services de computeur du type enregistré. Le système reçoit les informations par des formes de "mark-sense" ou par une borne entre-active.

THE PURPOSE OF THE LONDON DEPARTMENT OF PSYCHIATRY CTS EXPERIMENT

1. To provide emergency and routine psychiatric consultations, supervision of procedures and back-up expertise from a remote location.
2. To make available a digital data link to the psychiatric medical file system and the psychiatric patient register to be available at University Hospital.
3. To educate medical and paramedical staff through the use of a TV-audio interactive link and a standard radio link.
4. To provide a resource, over the digital data link for the scoring and interpretation of standard psychological tests, after suitable norms have been developed.

JUSTIFICATION

1. With the availability of remote interactive consultation, procedure supervision and personnel resources, it will cease to be necessary to transport patients to the south to centres for specialized care. This should, ultimately, when proper, permanent communication channels are established, reduce the cost inherent in patient transport. A second effect of this linkage will be to keep patient care in the cultural and physical milieu familiar to patient and to retain the family physician as the primary health care delivery agent to patient.
2. If data linkages prove successful and can be eventually made economically attractive, unnecessary duplication of computing data storage and personnel resources can be avoided. This is especially true since populations are frequently too dispersed to justify computer facilities of adequate capability in the Northern areas.
3. Frequently, distance precludes staff travel to centres of known expertise in order to obtain essential education, especially with respect to new procedures, e.g. ultrasound, newly opened areas of care (pacemaker follow-up) and relevant research (psychophysiology). Easily available on-going TV programming is probably the only way to efficiently and economically distribute educational information.

4. Rapid analysis and report generation of psychometric examinations is often hampered by the inavailability of the tests, the interpreters and systems which score the tests. It is felt that this very valuable service can be provided on a routine basis over a digital data link, perhaps augmented by TV-audio and facsimile transmission.

RELEVANCE

The relevance of these "Experiments" is obvious. In fact, to view the establishment of an adequate communications network as an "Experiment" is to not see the over-all importance of these facilities and the essential role of information transfer and resource availability in this age. The social impact of adequate communication/computer-information accessibility/ education distribution/resource-person availability and even entertainment will be immeasurable in the long run. Wide-band communication is essential as simultaneous multi-channel TV, multi-voice telephone and high-speed multiplexed digital transmission demand this. We believe that the action of the introduction of these media on a routine, dependable basis will revolutionize not just health care but the very status of life in the North and involve the attitudes and life style of the inhabitants. This must itself be analyzed as to the desires of the inhabitants and ultimately the cultural revolution which will eventually follow if it is accepted and continued.

The work briefly outlined here relating to TV transmission is, in general, along the same lines as that stated in a proposal by the OECA. The experiment as a whole will be accomplished in cooperation between the Department of Psychiatry University Hospital and the Departments of Psychiatry within the University of Western Ontario.

BACKGROUND

The availability of TV studios, transmission equipment, video tape and other video equipment in the Instructional Resources Department at University Hospital has led the Department of Psychiatry to become involved in both the recording and real-time viewing of therapy sessions and other procedures. Two members of our staff, Dr. J. Aufreiter and Dr. F. Mai have been involved in the use of TV for educational purposes. Similarly, the Department of Psychiatry has established a computer system for bio-psychological experimentation and computerized medical records. The Co-Ordinator of Computer Applications, University Hospital is a member of the Department of Psychiatry staff and is presently involved in organizing hospital computer systems.

The Department of Psychiatry has attached to it a full-time psychologist whose special interests include autonomic

conditioning and automation of psychological testing and this person will be the major investigator in projects relating to Psychology.

DETAILED DESCRIPTION (Carey 1974)

Television (Experiment 1)

The TV transmission used in the first experiment will be of two types:

a) Real-time interactive, in which a patient may be remotely interviewed or an interview may be observed and the local interviewer prompted via a head-set.
b) Off-line, in which programs or audio-visual transmissions will be recorded at one or the other end for later viewing. There will probably be an automatic answering unit at both ends for unattended operation.

The purpose of this experiment will be to evaluate the usefulness of these techniques, both in terms of educational benefit and actual therapeutic value.

The Digital Data Link (Experiment 2)

Through the use of the proposed psychiatric medical record system, University Hospital will have the unique resource of a highly structured, carefully planned, psychiatric medical record, stored on high-speed discs. This will be a 24-hour per day facility accessible by remote terminals.

The basic communication data rates available run from 110 BPS to 2400 BPS with access provided to 10 simultaneous users.

This experiment will involve providing access to this facility by means of a cathode ray tube (CRT) terminal, a low-speed printer (30 CPS) and an optical mark-sense document reader. The purpose will be to assess the usefulness of such systems in the North, either on-site or via remote communication link. We feel that the most important aspect of this system in terms of this project is the creation of a psychiatric data register. This will provide a start on a meaningful epidemiological registry on the demographic distribution of illness and health care delivery resources in the North.

Experiment 3

The educational aspects of the project are the same as those placed forward in a proposal by OECA and will not be dealt with here.

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Experiment 4

The carrying out of automated psychological testing and reporting is an important project in terms of impact.

The prime purpose of this particular project is to demonstrate the usefulness of this resource, educate personnel and provide adequate psychological-psychometric back-up to northern physicians.

DESCRIPTION OF OPERATIONAL PROCEDURES DURING THE EXPERIMENTS

1. The use of the TV-audio link for consultations, the supervision of procedures and the provision of back-up expertise in necessary situations, will be made possible through the facilities of the Instructional Resources Department at University Hospital. In addition, programs etc. may originate directly from the Department of Psychiatry from a newly developed room with special facilities for group therapy televising.

   A consultation will occur on request from the North location and the involved members of the Department of Psychiatry (psychiatrists, psychologists and nursing) will be notified.

2. The digital communication link will probably be a 2400 BPS full-duplex line. The North facility will be connected via the digital communication linkage to the Department of Psychiatry computer at University Hospital.

   Information may be stored or retrieved by either an experimental interactive patient history program or the patient data register program.

3. Education of personnel involves the creation of video tapes on important subjects or live programs. Both will be carried out at the Instructional Resources studio. Rounds-type sessions will also be held in the studios or from the Department of Psychiatry, allowing even "bedside" presentations.

4. The use of standard psychological testing forms and their administration will be done by psycho-technicians at the North facility. Interpretation will be performed on the PDP-10 computer at the University of Western Ontario or the PDP-11/40 system at University Hospital.

DATA GATHERING, ANALYSIS; REPORTING ON EXPERIMENT SUCCESS

Two major criteria are envisaged in assessing the success of the experiments. They are:

1. The quality of the information subjectively defined (e.g., whether the content of an interview was receivable via the TV-audio link by the viewers, or whether the Psychological Test Report was readable and useful to the facility in the North).
2. The frequency of use of the provided facility (i.e., whether the computer is accessed, a program is watched, or a rounds attended).

The above will be done by monitoring the channels as to frequency (especially the computer link) of use and by the administration of questionnaires by our psychologist and designed to elicit data on both acceptability of this resource and the subjective judgement of the quality of the exchanged data.

A report will be submitted on success or failure of the experiments and on the effect and projected long-term effect of the experiments both in the North and on the resources at University Hospital, including staff time involved, if such facilities were continuously available. We feel an important part of our involvement in this project is the assessment of the social and educational impact of these resources on the involved institutions, the staff and the people other than staff affected by them.

THE AUTOMATED PSYCHOLOGICAL TEST BATTERY (Evans 1974)

The program for development of psychological assessment and diagnostic evaluation tools is seen as progressing in three steps:

a) Normative studies and test construction;
b) Training of local mental health workers in administration of these assessment devices;
c) Development of the data transmission system and the feedback of reports useful in assessing therapeutic programs for the individual patient.

A. Normative Studies and Test Construction

The use of any presently existing psychological test in diagnosis and treatment planning for psychiatric patients will be adapted for use with the cultures and subcultures encountered in the Moose Factory catchment area. The tests which are being considered for adaptation are:

a) WAIS (Wechsler Adult Intelligence Scale) This test is extremely valuable, not only in assessing intelligence, but in determining thought disorder, affective illness and some forms of organicity. It is also helpful in assessing cognitive and perceptual style. Three of the seven subscales would have to be revised. Norms for Moose Factory would have to be established.

b) MMPI (Minnesota Multiphasic Personality Inventory) A self-administered empirically derived personality test which is valuable in diagnosing psychiatry dysfunction. Norms for Moose Factory population would have to be established.

c) DPI (Differential Personality Inventory) A self-administered personality test frequently used to supplement the MMPI, also lacking norms for the Moose Factory population.

In order to conduct normative studies, representative samples of people in the Moose Factory catchment area will be tested with this battery. This would then offer the psychologist a standard by which to compare future psychiatric patients. It is expected that 300-400 selected people in the Moose Factory area would comprise a reliable sample size on which to base norms. To obtain this data, it will probably take two psychologists a minimum of several months.

B. Training of Local Mental Health Workers

Local technicians will be trained to administer and score the above tests. This training would involve approximately 30 classroom hours for university level students.

C. Data Transmission and Therapeutic Programming

Once the diagnostic tests are completed, the form is read by the optical mark-reader, formatted, and, using the satellite, is then transmitted to University Hospital in London where the computer will score and interpret the test and a staff psychologist would prepare a diagnostic report. This could then be available for the proposed "rounds" transmitted by satellite. In addition, a printer will be available in the North to receive the test result printouts.

The battery as it presently exists, has operational the following tests shown in Table 1. The programs are written in FORTRAN and are presently operational on a Cyber 73 and PDP-10.

SUMMARY

The prime purpose of the experiments is the demonstration of the usefulness of a satellite as a communications resource in the provision of education and clinical assessment back-up to remote populations. The experiments will also provide a unique opportunity for remote facilities to evaluate the usefulness of an Automated Psychological Test Battery and a patient data register in their environment.

REMOTE SERVICES VIA SATELLITE

TABLE 1

CONSTITUENT TESTS IN THE SCREENING BATTERY

Test	Function	Admin. Time	Mode of Administration
Raven Progressive Matrices	Non-verbal Intelligence	20-30 mins.	Self
WAIS-Clarke Vocabulary Test	Verbal Intelligence	10-20 mins.	Self
Trail Making Test	Presence of Organicity	5 -10 mins.	Technician
Minnesota Percepto-Diagnostic Test	Presence of Organicity	5 -10 mins.	Technician
16 PF	Personality	40-50 mins.	Self

The MMPI is presently nearing completion.

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